North Sea Oil and Gas: A Report to Parliament

Serious exploration of the United Kingdom part of the Continental Shelf started as short a time ago as 1964. In April 1964, Parliament passed the *Continental Shelf Act*, which empowered the Government to issue exploration and production licences. In September 1964 the first licences were granted. In December 1964 drilling of the first well was begun.

Progress since then has been rapid. There were three further rounds of licensing in 1965, 1970 and 1971-72, and by the end of December 1972 the oil industry had drilled 443 wells, including 180 production wells (see Figure 1). Big discoveries have been made, and Britain will soon be numbered among the world's significant oil producers. This is an achievement unparalleled by any other oil and gas producing nation in the world. Figure 2 indicates the gas fields discovered in the southern basin of the North Sea. Oil and gas finds in the northern basin are shown in Figure 3.

1 The Sequence of Events

A difficult environment

Asked about the difficulties involved in exploring and developing the oil and gas deposits of the North Sea, one oilman described the offshore weather conditions as the worst and most unpredictable his company had ever encountered in its worldwide search for petroleum. 'Not an attractive environment' was his summing up. The technological difficulties are considerable in the southern basin, where exploration first started (for instance, water depths range from 100 to 200 feet), but the problems facing the prospecting companies in the northern parts of the Shelf are far greater and, indeed, approach the limits of present technology. In the southern sector the big reserves of gas discovered in 1965 and 1966 provided the economic stimulus which overcame the technological obstacles in a relatively short time, and in fact the gas was being piped ashore within two years of its discovery. But the difficulties involved in exploiting the large oil deposits found in the northern sector are formidable. For example, off the Scottish coast (where the Forties and Auk oilfields are located) water depths are of the order of 200–450 feet; off the Shetland Islands (where the Brent field was recently discovered) they range from 400 to 600 feet; and further north they can be well over 600 feet. In winter the wave height averages more than 7 feet for 50 per cent of the time and exceeds 15 feet for 20 per cent of the time, and sea temperatures fall to 4°C and air temperatures to below freezing point. In a storm, waves can be as high as 100 feet and winds can gust to 100 mph. And all the oil fields lie far from the shore. Little wonder then that the area remained completely unproven until the discoveries of big gas fields in the province of Groningen in the Netherlands in 1959 and 1962 triggered off immense interest in the possibility that they might extend under the North Sea.

Progress on the United Kingdom Continental Shelf

Natural Gas

Exploration began in the southern basin of the North Sea, and here it was that in 1965 British Petroleum made the first find of natural gas—the West Sole field, about 40 miles off the Humber. Fixed platforms were built on the field, and by 1967 gas was coming ashore through an undersea pipeline to a shore terminal at Easington (see Figure 9). In 1966 three more large fields were discovered off the Norfolk coast—Hewett (Phillips/Arpet) Leman Bank (Shell/Esso) and Indefatigable (Gas Council/Amoco)—the gas from all of which is landed at a large shore terminal at Bacton. In mid-1968

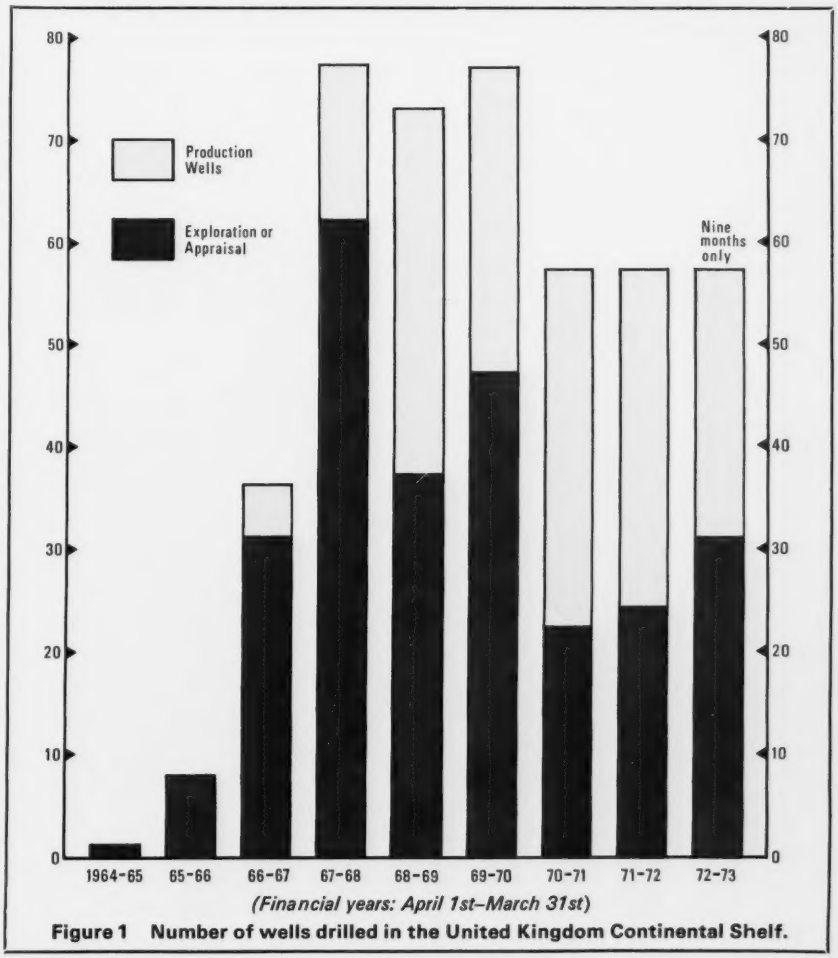


Figure 1 Number of wells drilled in the United Kingdom Continental Shelf.

yet another commercial field—Viking (Conoco/NCB)—was discovered, and gas from it started to flow through a terminal at Theddlethorpe this autumn.

These discoveries have virtually revolutionised the British gas industry. In 1960, although the gas industry was starting to move towards new oil-based processes, about 90 per cent of the total gas manufactured in this country was still derived from coal, most of it by processes which had not changed fundamentally for 150 years. Today, only eight years since exploration of the Continental Shelf first started, over 90 per cent of the country's gas supplies come from the North Sea (Figure 4 shows the growth in production), and gas consumption is double that of 1967.

Operations suggest that natural gas reserves in the southern basin are in the region of 32 trillion cubic feet—enough, given an average depletion period of 20 years, to support an average production rate in the mid-1970s of over 4000 million cubic feet a day. This assessment is, however, subject to continuous review since uncertainty about the size of reserves in any field can persist for some time, even after production has started. It also includes some small discoveries which by themselves may not be commercially viable. The small fields may not therefore be available to the Gas Council who must base their marketing plans on gas already under contract (which on current estimates would amount to nearly 25 trillion cubic feet). They include the discoveries made by the following companies (the figures are the block numbers):

Total 41/24	Shell/Esso/Allied Chemical/NCB 49/25
Burmah 47/14	Phillips 49/6a (Ann)
Hamilton/Whitehall 43/8a	Conoco/NCB 49/16 and 21 (Broken Bank)
Hamilton 43/20a	Mobil/Conoco 49/22
Gulf 47/8 (Rough)	Ranger 48/18b
Conoco/NCB/ Tricentrol 47/13a	Signal 53/4a
Arpet 49/28	

Further supplies of gas are assured from the United Kingdom part of the big commercial gas field, Frigg, discovered in the Norwegian sector of the northern basin in 1971, which extends across the boundary line into the United Kingdom sector. Additional reserves will be available in the form of associated gas from some oil fields in the northern basin, but the amounts cannot be estimated until further appraisal has been carried out.

Oil

British Petroleum, the first company to find gas in the United Kingdom Continental Shelf, was also the first to discover commercial deposits of oil—in the Forties field off the Scottish coast. In December 1971, BP estimated the peak production potential of the field to be 400,000 barrels per day or 20 million tons a year. The oil finds which are now proved to be commercially viable are:

Field	*Date when commercial viability was announced*	*Date of Discovery*
21/10 Forties (BP)	December 1971	November 1970
30/16 Auk (Shell/Esso)	February 1972	February 1971
211/29 Brent (Shell/Esso)	August 1972	July 1971
30/24 Argyll (Hamilton)	December 1972	August 1971

Other finds which have been made and are still being assessed are:

	Date of discovery
22/18 Montrose (Gas Council/Amoco)	December 1969
30/13 Josephine (Phillips)	September 1970
30/2 (Hamilton/Burmah)	June 1971 (Gas/Condensate)
211/26 (Shell/Esso)	September 1972
211/18 (Signal)	September 1972
9/13 Beryl (Mobil)	September 1972

From the finds so far made and from information derived from recent drillings, it is estimated, allowing for a probable delay of six years between the discovery of a field and its reaching peak production, that North Sea oil output may reach some 75 million tons a year by about 1980, and perhaps more during the 1980's. This estimate will be reviewed early this year, when the results of the 1972 drilling programme have been evaluated, but much more drilling will be required before the total size of the petroleum province can be firmly established. It is unlikely that at this stage any estimate above 75 million tons could be made with any degree of accuracy.

To keep the North Sea oil finds in perspective, it should be borne in mind that the United Kingdom's present oil requirements (Figure 5 shows the source of the supplies) are about 100 million tons a year, and, although it is difficult to forecast annual growth rates, our oil consumption is likely to increase at a rate which suggests that oil from the United Kingdom Continental Shelf may be equivalent to only about half of our annual consumption in 1980. Estimated United Kingdom production should also be compared with world output of crude oil (see Figure 6): in 1971 this was about 2,500 million tons per annum, of which some 460 million tons was offshore oil.

Figure 2 Main gas fields discovered in the southern basin of the North Sea.

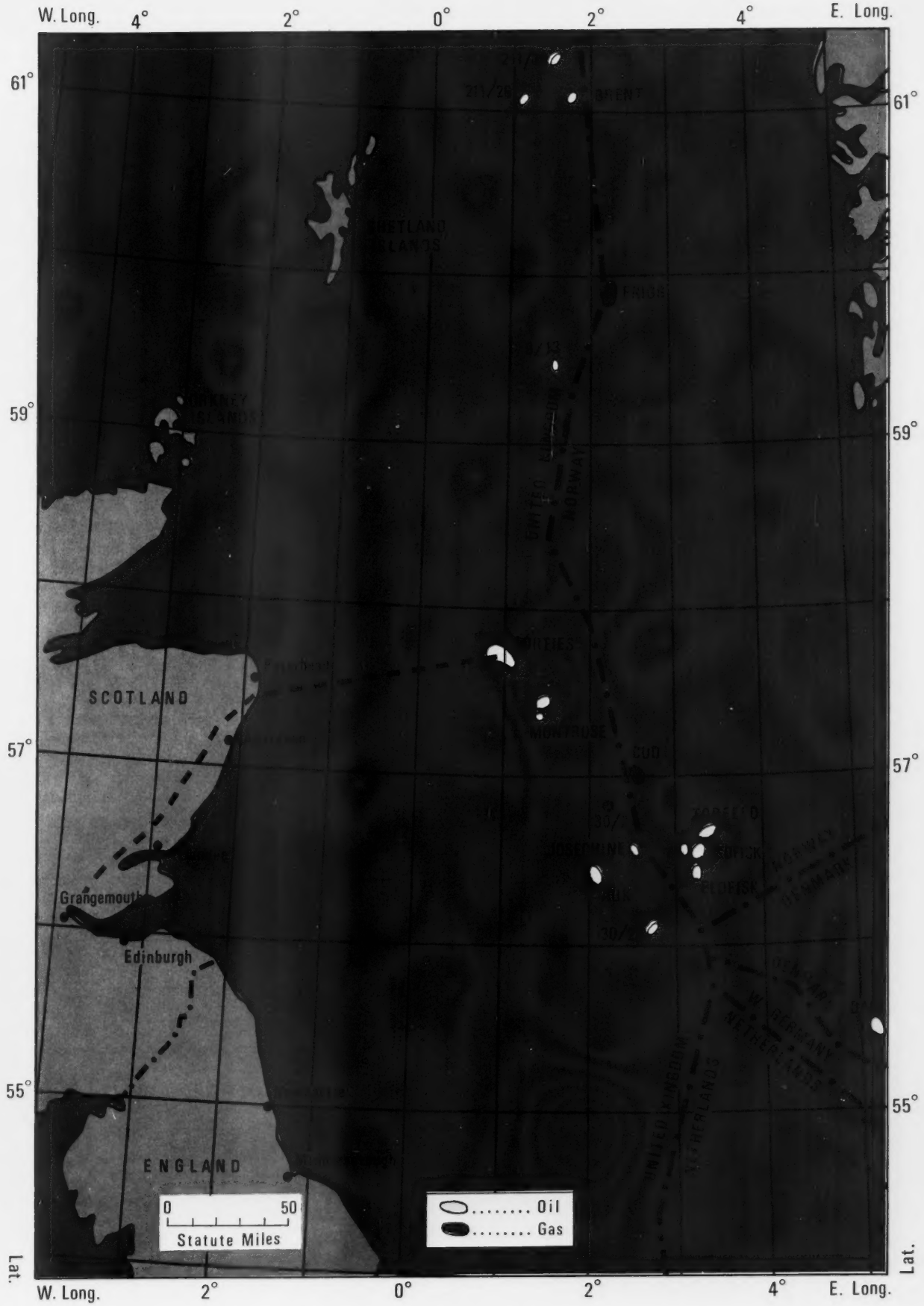


Figure 3 Oil and gas finds in the northern basin of the North Sea.

Other sectors of the North Sea

Norway

The first Norwegian offshore licences were granted in 1965. Since then about 80 wells have been drilled, and the following five commercially viable fields have so far been discovered:

	Field	*Block*	*Licensee Group*
OIL and GAS	Ekofisk West Ekofisk	2/4 2/4	Phillips. Discovered late in 1969; production from Ekofisk started in mid-1971; oil being transported by tanker.
OIL	Torfelt	2/4 2/5	Phillips Amoco
GAS	Cod	7/11	Phillips. Condensate field
	Frigg	25/1	Petronord. The field was discovered in Norwegian block 25/1, but it has since been confirmed that it extends into the United Kingdom block 10/1.

There have been other discoveries, some of which (particularly those recently announced in the vicinity of Ekofisk) could be commercial. Present plans for oil production from the Ekofisk area are for an offtake of some 500,000 barrels/day (25 million tons per year). This figure could well be increased as a result of the recent discoveries.

Denmark

Since the licensing of the Danish Continental Shelf in 1963, about 16 exploration wells have been drilled. Oil was discovered in the small Dan Field, from which production started last summer, the oil being carried to Denmark by tanker. Some gas discoveries have also been made, but their commercial potential has not been reported, and no production plans have been announced.

West Germany

About 13 exploration wells were drilled between 1965 and 1967. No commercially viable discoveries have been announced, although some gas has been found in a couple of wells.

Netherlands

Since licences were first issued in 1968 about 75 wells have been drilled in the Netherlands Continental Shelf, and others in Dutch territorial waters, mainly around the Friesian Islands north of Den Helder. Several gas discoveries have been made, and one field is scheduled to come into production in 1975. One oil find is apparently of commercial significance. No other production plans have been announced.

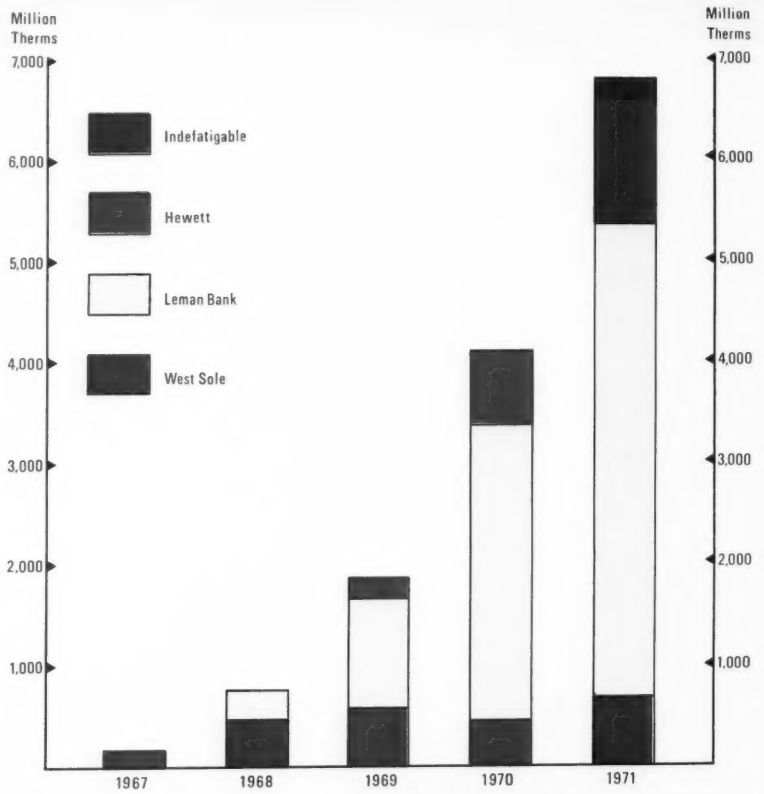


Figure 4 Production of natural gas from the North Sea, 1967-71.

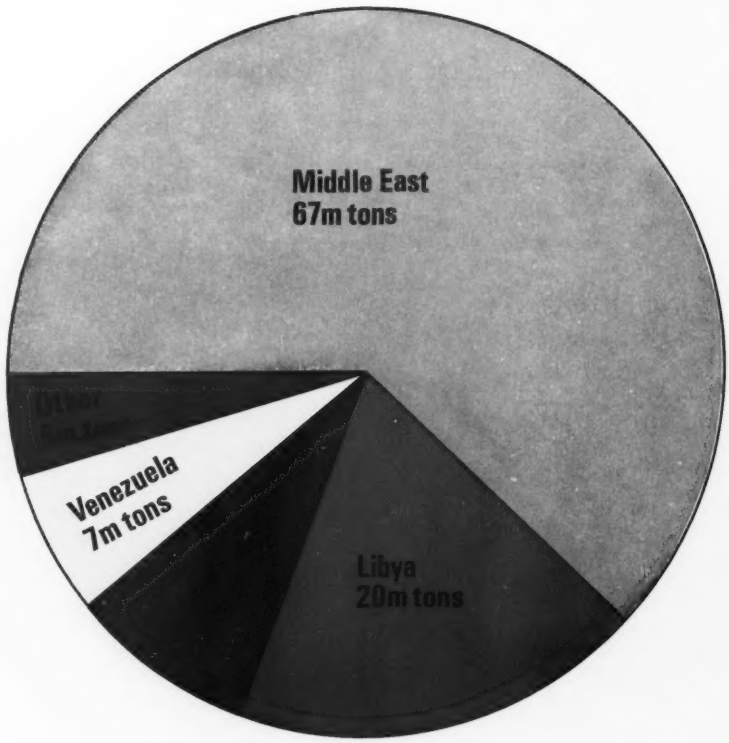


Figure 5 Breakdown by origin of United Kingdom imports of crude and process oils in 1971.

2 History of Government Policy

Introduction

The Convention on the Continental Shelf adopted by the United Nations Law of the Sea Conference in 1958 provided that a coastal state has the right to the natural resources of its sector of the Shelf, but it is left to the state to draw up any rules for exploration and exploitation. The discovery of gas at Groningen in 1959 and 1962 stimulated the oil companies to carry out seismic surveys in the North Sea, and the companies were anxious to obtain exclusive licences to enable further work to proceed. It was against this background that the United Kingdom seized the opportunity offered by the Convention. In 1964 Parliament passed the Continental Shelf Act, which gave the Government power to grant licences to search for and extract petroleum (oil and gas). It also provided for the safeguarding of the interests of other parties in respect of possible obstruction to navigation, interference with submarine cables and pipelines and the prevention of leakages of oil into the sea. After enactment, the United Kingdom ratified the Convention.

For licensing purposes, the United Kingdom Continental Shelf was divided into 'blocks', each having an area of about 200–250 square kilometres (about 80–100 square miles). Licences were of two types: an exploration licence, which permitted the holder to carry out exploration work in all designated areas not covered by exclusive production licences; and a production licence, which was issued for specific areas and permitted the holder to search for and extract any petroleum found in that area in return for certain rental and royalty payments. The map in Figure 7 shows the blocks allocated in the four licensing rounds to date.

First round of licensing: September 1964

In the first round of licensing, the Government (like succeeding Governments) placed the main emphasis on a rapid and thorough exploration of potential resources, and the licence terms were settled with this object in mind. At that time, of course, it was necessary to induce companies to commit resources to exploration in a still unproven area, the North Sea, bearing in mind that in most cases their activities and interests were world wide. The discretionary (as opposed to the auction) system of licensing was chosen as the best means of encouraging the greatest number of applications and to make it easier to require the licensees to supply realistic work programmes. Royalties were fixed at 12½ per cent, which was representative of current rates throughout the world, and initial and annual payments were established at a level designed to encourage maximum exploration and development. The Government was also concerned to provide adequate opportunity for British participation in exploitation of North Sea resources, and contribution to the United Kingdom fuel economy was made a further criterion for allocation of licences. A balance had, however, to be struck between the need to encourage British participation and the need (in the interests of rapid development) to attract the financial resources and technical expertise of the worldwide oil industry, and there could be no question of a restrictive policy.

In the first round 53 production licences were issued to 51 companies, covering 348 blocks. The criteria used in granting the licences are listed in Table 1, together with those for the other three rounds; the financial arrangements for all four rounds are shown in Table 2. Table 3 presents facts and figures relevant to each round.

Second round of licensing: November 1965

The boundary lines with Norway, Denmark and the Netherlands were settled soon after the first round was completed, and it was subsequently decided to extend activity up to the newly defined boundaries. The terms and conditions were substantially the same as for the first round, and 37 licences were issued to 44 companies, covering 127 blocks.

Third round: June 1970

By the end of 1968, only four years after the first licence was granted, 178 wells had been drilled and over £150 million invested. Five main gas fields had been discovered and some smaller finds made and resources were expected to be capable of supplying about 3,500 million cubic feet of gas a day by 1975. To maintain the momentum, a third round of licensing was initiated in September 1969, this time covering the Irish Sea in addition to the North Sea. The criteria for the North Sea were similar to those for the second round; for blocks in the Irish Sea there was a stringent criterion that applications for licences should provide for participation with a nationalised industry. The financial terms were slightly increased to allow for the change in money value since 1964. 37 licences were issued to 61 companies, covering 106 blocks.

Fourth round: December 1971 and March 1972

Late in 1970 it became apparent that another major round of licensing was required: oil had been discovered in the northern basin of the North Sea, off the Scottish coast; major operators needed more prospective territory to explore; and it was essential to keep up the momentum. Developments influencing supplies of oil from abroad emphasised the urgency of acquiring a home-based source of oil, and further discoveries of gas and, particularly, oil in the North Sea would obviously not only reduce our current dependence on imported crude but also greatly improve our balance of payments. It was therefore decided that the main objective in the new round of licensing should remain as in the earlier rounds—to secure the maximum effort from licensees in exploration and exploitation, with adequate opportunities for participation by British companies. There were also implications for British equipment and plant manufacturers, who without a considerable home market would be unlikely to play a significant role in producing equipment for petroleum exploration and exploitation. A major round of licensing would, it was hoped, provide manufacturers with an incentive to play such a role, so reducing reliance on imported equipment and paving the way to capturing overseas orders.

System of licensing

The discretionary system of licensing had served the United Kingdom well during the initial phase of opening up the Shelf, but it was recognised that some parts of the North Sea were, by the fourth round, moving out of the initial exploratory phase. Whilst there were suggestions

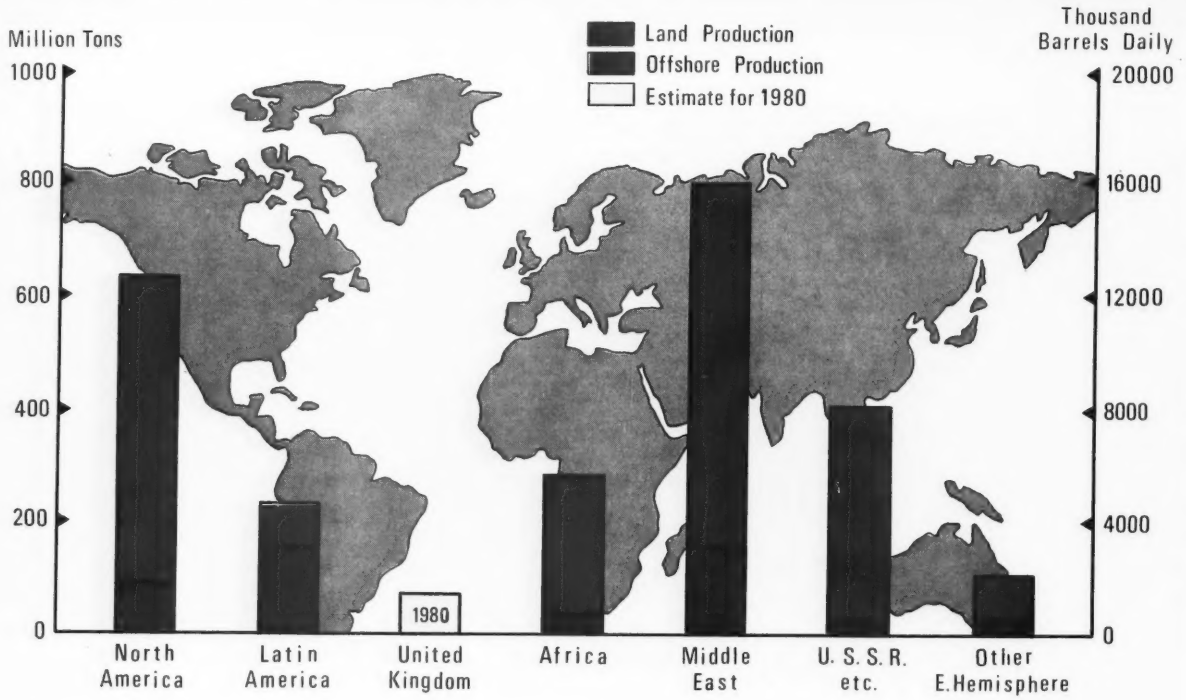


Figure 6 World production of crude oil in 1971, broken down by regions.

made, it could not be known, however, what initial payments the market would bear and still be interested in the less attractive parts of the licensing areas. Thus it was decided to continue to rely on the discretionary system, but to carry out a simultaneous, but limited, exercise in tendering, with the aim of testing the market by auctioning 15 blocks representative of all types of prospects in areas where hydrocarbons had been discovered. Four areas were selected for licensing: the northern and southern basins of the North Sea, the Western Approaches and Celtic Sea, and the area to the west of the Orkneys and Shetlands.

Northern basin

The northern part of the North Sea was of considerable interest. The Ekofisk field had been discovered in the Norwegian sector in 1969; in the British sector there had also been discoveries off the Scottish coast, including in particular the Forties field in November 1970. The size and commercial importance of the discoveries remained to be established, however, and in the whole of the United Kingdom part of the area, covering about 62,000 square miles, only 25 exploratory wells had (by the end of 1970) been drilled—of these, 21 were dry. Hence, though the signs were encouraging, there was no certainty that a major oil-bearing area existed. In the Norwegian sector no oil in quantity had been discovered outside the Ekofisk area.

Southern basin

This area had featured in each of the three earlier rounds in 1964, 1965 and 1970. A number of important gas fields had been discovered, but, though the best prospects were thought to have been taken up, significant areas were still available for further exploration as a result of the surrender of territory from the first round of licensing.

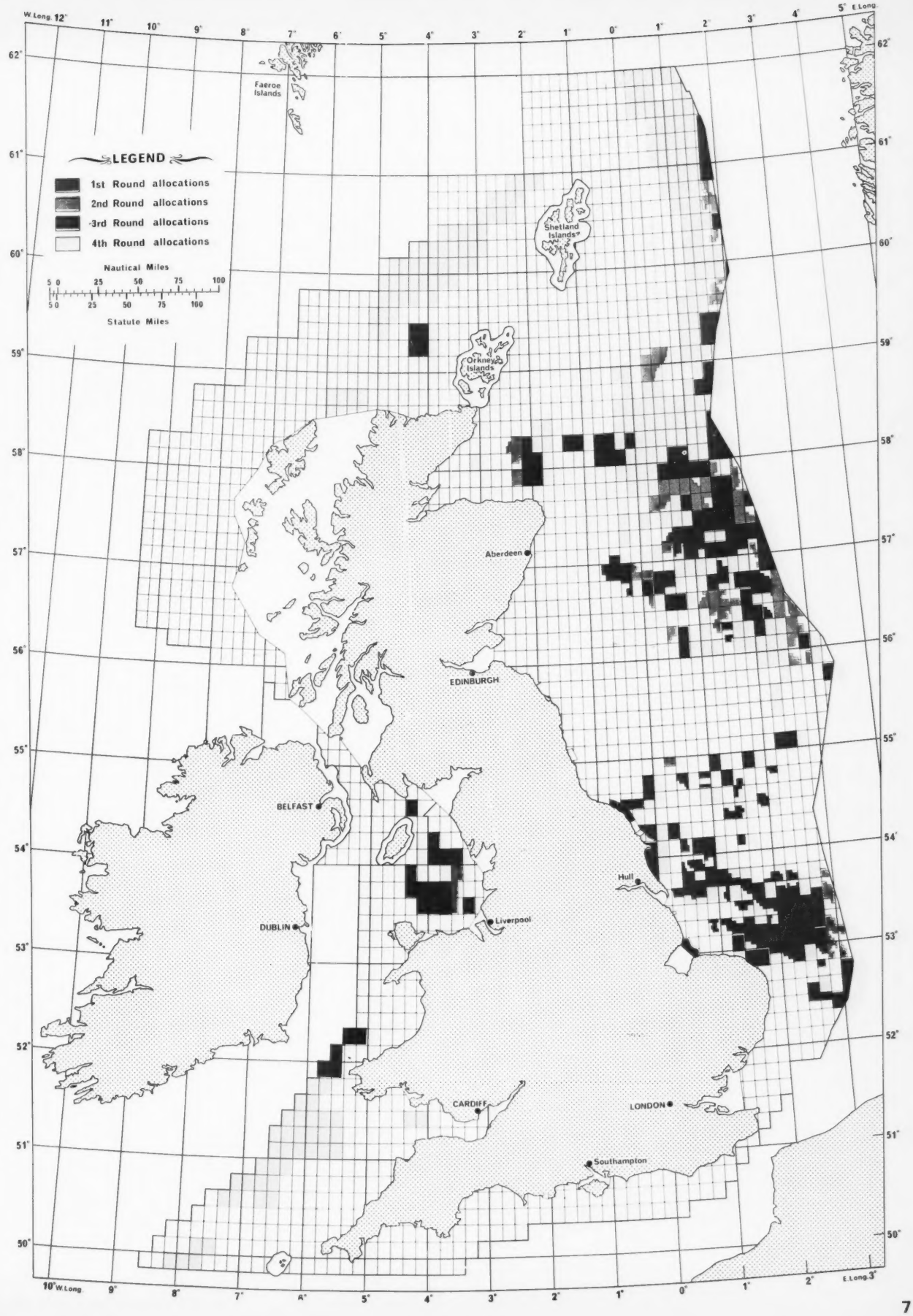
Other Areas

The Western Approaches, the Celtic Sea and the area to the west of the Orkneys and Shetlands were all untested by drilling, but seismic surveys by holders of exploration (as distinct from production) licences had revealed geological structures which might contain oil or gas, and which hence merited testing.

In the fourth round, therefore, the blocks were allocated on either a discretionary or an auction basis. The auction experiment (a total of about £37 million was paid for the blocks) gave a good indication of the industry's evaluation of different types of prospects, and an encouraging feature of the discretionary licensing was the spread of interest outside the oil industry to groups encompassing the banking, commercial and industrial sectors. The results of the auction experiment will be taken into account in deciding the terms of future rounds of licensing. A total of 118 licences were issued to 213 companies covering 282 blocks.

Table 4 gives details of those parts of the United Kingdom Continental Shelf which have been licensed, broken down by area.

Figure 7, on page 7. Map showing the blocks allocated in the four rounds of licensing.


LEGEND
1st Round allocations
2nd Round allocations
3rd Round allocations
4th Round allocations
Nautical Miles
5 0 25 50 75 100
50 25 50 75 100
Statute Miles
Faeroe Islands
Shetland Islands
Orkney Islands
Aberdeen
EDINBURGH
BELFAST
DUBLIN
Liverpool
Hull
CARDIFF
LONDON
Southampton
W.Long.
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3 Geological Factors

Petroleum—an extremely complex mixture of hydrogen and carbon compounds (hydrocarbons) and small amounts of nitrogen, oxygen and sulphur—occurs in various gaseous, liquid, semi-liquid and solid forms. Organic in origin, it was formed in most cases from the remains of countless aquatic (mainly marine) organisms which were present in ancient shallow seas and lagoons at various periods in geological time between 10 million and 440 million years ago. These tiny creatures died, and sank to the sea bottom, where they became mixed with decaying vegetation and rapidly buried by fine silts and muds washed down by rivers. As successive layers of sediment were deposited on top of them, the increase in pressure and temperature led to chemical changes which transformed the soft parts of the buried organisms into oil and gas.

Hydrocarbons can also—though more rarely—be of non-marine origin, coming from the remains of trees and plants growing in deltas, swamps and lagoonal areas of the earth some 300 million years ago. Like the marine organisms this vegetative material was gradually buried by silts and muds, then compacted to form coal-bearing rock strata, and, under conditions of high pressure and temperature, transformed to oil and gas. Conditions favourable for the formation and accumulation of petroleum occur where parts of the earth's crust have been sufficiently depressed to allow great thicknesses of sediments to be deposited. For a commercially exploitable accumulation of petroleum to occur, the following features must all be present:

a) a suitable source from which petroleum has been generated;

b) a suitable formation of reservoir rock with sufficient porosity and permeability for petroleum to accumulate;

c) a suitable over-lying impervious formation or 'cap rock' which will prevent the escape of petroleum to the surface; and

d) a suitable deformation of the structure, enabling petroleum to migrate and accumulate in the reservoir rock.

In searching for petroleum, therefore, the oil company looks for potential structural or stratigraphic traps within those sedimentary basins of the world which have a geological history conducive to the formation, migration and accumulation of oil and gas.

As can be seen from Figure 8, the United Kingdom Continental Shelf can be divided into two broad geological regions: the North Sea and the region to the west of the United Kingdom. Both regions

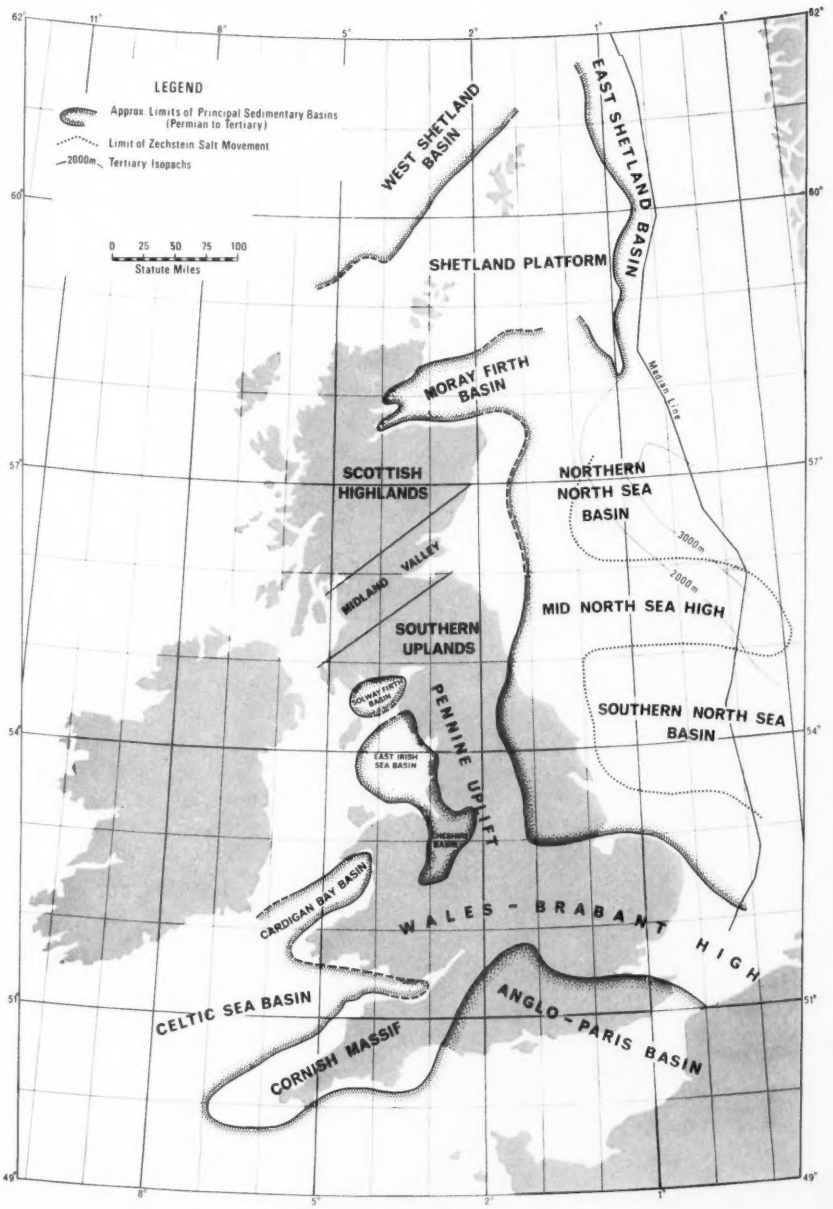

Figure 8 The geology of the United Kingdom Continental Shelf.

contain several sedimentary basins. In the North Sea region there are four: the Southern Basin (Paleozoic/Mesozoic), the Northern Basin (Mesozoic/Tertiary), the East Shetland Basin (Mesozoic/Tertiary) and the Moray Firth Basin (Mesozoic). It is in the first three of these that gas and oil has been found. Basins of similar type in Russia, North Africa, West Texas, Oklahoma, Australia (Cooper's Creek) and Western Canada are estimated to contain about 22% of the world's petroleum reserves. The North Sea Basins as a whole are probably comparable in size to the Permian basin of West Texas, but they are only a fraction of the size of the Western Canadian and Russian basins.

In the United Kingdom western geological region there are several 'intermediate' basins, of a type which occurs between the stable continental areas and the oceans. Similar, though much larger, basins are found in the Middle East, the Gulf Coast of Texas and the North Slope of Alaska, and contain an estimated 57 per cent of the world's reserves. With the exception of the West Shetland, Celtic Sea and Western Approaches basins, the United Kingdom basins are small and seem unlikely to contain large reserves of petroleum.

4 Offshore Exploration and Production

Initial stage

To state the obvious: the first step in offshore exploration is to locate suitable geological formations which might contain oil or gas. The commonest method of doing so is by marine seismic surveys. Briefly, sound waves are transmitted through the water and sea bed, and the reflections are recorded and analysed, using a variety of sophisticated techniques, to give a picture of the geological structures. This picture, taken in conjunction with any other available information (such as data on regional geology, and the results from any wells drilled in the area), indicates the most favourable sites to drill and the depth at which prospective reservoir rocks are expected to occur.

Drilling stage

Drilling installations (platforms, barges or ships on which drilling rigs are mounted) are normally owned and operated by a drilling contractor, and licensees hire the contractor and installation to drill, say, one well or several over a period of years. The type of installation used depends upon the depth of the sea and possible storm conditions. A jack-up unit—so-called because the drilling platform is jacked up on legs (which rest on the sea-bed) to above the water-level—is normally used in less than 200 feet of water. This type of installation (Figure 10) is highly stable, but can be moved only in calm seas, and waiting time may therefore run into several weeks. In deeper water, such as will be typical of most future United Kingdom offshore operations, a floating installation will have to be employed—either a drill ship or a semi-submersible. A drill ship is a ship fitted with a rig which drills through an aperture in the middle of the vessel, or, in some cases over the ship's side. A semi-submersible (see Figure 11) has, as the name suggests, submerged pontoons which support the working deck well above wave level.

Floating installations are normally anchored to the sea bed, although dynamic positioning, by propellers appropriately oriented to counter the effects of wind and current, is now beginning to be used. However, in the waters around Scotland, where very high waves and winds may occur, keeping the platform in position is a major problem whichever method is employed.

Of the installations now available, only the semi-submersible can operate in Scottish waters in winter, and then only with difficulty; drill ships are less able to smooth out wave-induced vertical rig movements and can operate only in the 'summer season' (from about May to October). To meet these requirements, a new generation of large semi-submersibles is being built, and the number of exploration installations at work in the United Kingdom sector of the North Sea is expected to increase from last year's peak of 14 to about 25 in 1974, and the average number operating throughout the year from 9 to 18. The new generation of installations will cost about £10 million each to build, and, with the associated supply boats, helicopters, etc, as much as £20,000 per day to operate. To drill a 10,000 feet well in 60 days, a company would therefore have to lay out more than £1 million.

In the North Sea, the ratio of successful wells to wells drilled is reasonably good (about 1 to 6), but the ratio of commercially viable wells is only 1 to 20 or less, so that £10–30 million may have to be spent on drilling before a commercial oilfield is discovered. Skill and luck both come into it: some licensees may spend this sum of money and still find nothing; others may make a discovery at the first attempt. Finding a field is, of course, just the end of the beginning, and two or three more wells at least have to be drilled to determine whether the field is commercial.

Field development

At the development stage the depth of water over the field is very important. So far, all North Sea (and virtually all other) offshore fields have been developed using fixed platforms firmly secured to the sea bed. The cost of a platform rises rapidly in proportion to the water depth, from about £1.5 million for a platform off Yarmouth in 100 feet of water, to £20

Figure 9 Aerial view of BP's North Sea Gas Terminal at Easington, Yorkshire.

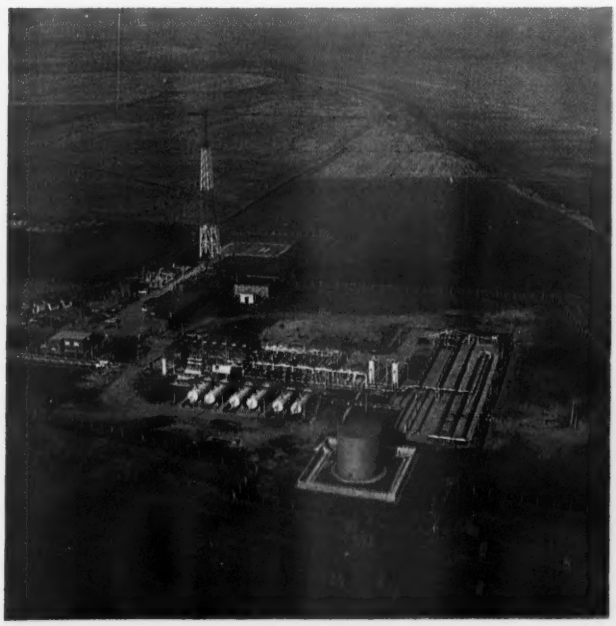

Figure 10 Jack-up rig 'Britannia' built on Tees-side.

Figure 11 The 'Staflo' semi-submersible drilling platform built on Tees-side.

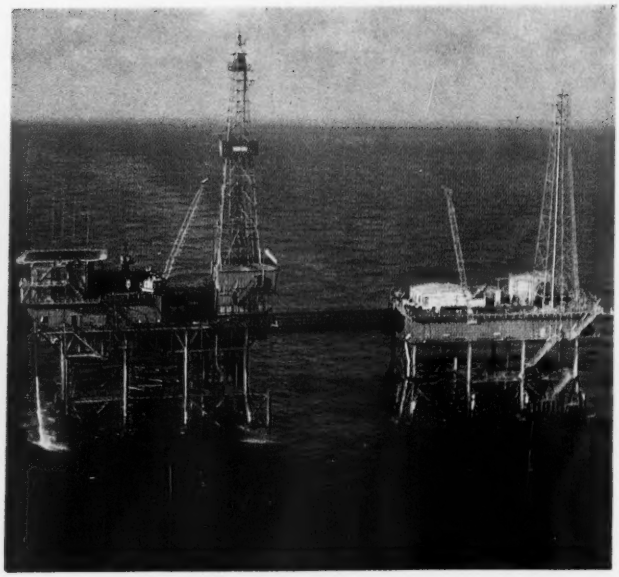

Figure 12 Fixed drilling platform and production platform in the southern basin of the North Sea.

million or more for a platform off Aberdeen in 400 feet of water. In deeper water (e.g. the 500 or 600 feet of water off the Shetlands), the cost could rise to more that £40 million. No platform has yet been constructed in such a depth of water anywhere in the world, and, although it is technically feasible to do it, the immense cost has prompted a search for alternative methods. An entirely new field of technology is therefore emerging, encompassing such developments as completing the well under water (without the need for a fixed platform)—for example, by remote controls, or using two-man submarines fitted with remotely operated arms, or a diving bell which locks on to a capsule enclosing the wellhead, so enabling the technician to work as if on land. This need for new techniques presents the United Kingdom with the opportunity of playing a leading part in offshore technology.

Production

Getting oil or gas to flow from a well is not like turning on a water tap. The fluids have to be lifted from thousands of feet below the sea bed, and, though at first the pressures in the subsurface formations may be enough for the fluids to flow naturally to the surface, in time it may be necessary to use supplementary lifting methods, or to inject water or gas into the subsurface reservoir through special injection wells so as to maintain the reservoir pressure and hence the flow. Once they have been got to the surface, the fluids have to be separated before being transported ashore, but, provided there is a platform above the sea level, the production equipment required is similar to that used on land and presents no special problems. The platforms therefore usually have to accommodate not only separators, valves, dehydration units, prime movers, generators, pumps, compressors, level controllers, temperature controllers, etc, but also telecommunication equipment, fire-fighting equipment, life-saving appliances, and of course, living quarters and facilities for personnel. The cost of all this varies enormously from platform to platform, but can reach several million pounds.

Underwater completion of wells will require underwater production equipment. Such facilities, however, are only in the very early experimental stages, and it will be several years before they become practical propositions. Nevertheless the incentive to develop them will become greater as oil is discovered in deeper waters and as the cost of constructing suitable platforms rises with the depth of water.

A fixed drilling and production platform is pictured in Figure 12.

Getting the petroleum ashore

Once separated, the fluids from the well have to be got ashore:

Natural gas

Gas from gas fields is taken by pipeline to a shore terminal where, after further treatment to meet the Gas Council's requirements, it is fed into the main trunk gas system. Three terminals are now in operation—one at Bacton on the north coast of Norfolk, one at Theddlethorpe on the coast of Lincolnshire, and one at Easington in Yorkshire, just north of the Humber.

Gas produced in association with oil may have to be treated differently. If the technical behaviour of the field warrants it, the gas may have to be injected back into the reservoir to maintain the flow, or it may be used to lift oil from the subsurface to the wellhead. On the other hand, if it is available for sale, it will most probably be piped to shore like gas-field gas, thence to be fed into the Gas Council's trunk line.

Oil

The method of getting the oil on to dry land depends upon the rate of production, and such other factors as distance from shore and depth of water. In the case of the Forties field it is planned to pipe the oil ashore through a 32-inch diameter line to a point near Peterhead, and then transport it by land pipeline to BP's refinery at Grangemouth. Oil from the Auk field, on the other hand, will be loaded directly into tankers at the field, using single-point buoy mooring. Neither of these methods is trouble free. For instance, laying such a large-diameter line in the 400 feet of water over the Forties field is something of a record in itself. Pipelaying in deeper waters will be even more difficult—so difficult that a new generation of dynamically positioned semi-submersible pipelaying barges is being designed for the purpose. A pipeline's great advantage, however, is that it is simple and reliable to operate. In contrast, loading a tanker by single-point buoy mooring requires reasonable weather conditions, and the weather is notoriously bad in the North Sea. This method of disposing of the oil is hence liable to be interrupted by bad weather, often for several days at a time, and consequently consideration has been given to storing the oil in a floating or underwater tank until tankers can resume

loading. Installations of this type already exist in various parts of the world, but none has been in service for any length of time or under severe sea conditions. The first such storage vessels were all-steel structures, but now units are also being made in reinforced concrete. One such vessel is being erected on the Norwegian Ekofisk oil field. New ideas and new designs are being put forward all the time, and here again an opportunity exists for British firms to compete.

Refining

Much of the oil from the United Kingdom sector of the North Sea—and perhaps some from other sectors—will be refined in this country. Since the war, starting almost from scratch with only some 2¼ million tons of capacity available in 1947, the United Kingdom has built up a massive domestic refining industry. Successive Governments have pursued policies of encouraging home refining, and home capacity is now some 100 million tons a year—broadly equivalent to home demand. Plans are in hand, moreover, to increase this output even further. In Scotland, for example, the capacity of BP's refinery at Grangemouth has expanded from 0.6 million tons in 1950 to 9 million tons in 1971 and it is planned to double its present capacity. At present, Scottish demand is running at 10 million tons of refined products a year.

Due to the complex patterns of demand and supply, the United Kingdom has a substantial external trade in petroleum products, importing nearly a fifth of its needs (19.7 million tons in 1971) and exporting almost as much (18 million tons in 1971). The full range of the United Kingdom's demands has never therefore been met solely from the country's own refineries. This pattern can be expected to continue. For the same reasons, therefore, and to make optimum use of the high-quality and low-sulphur North Sea crudes, it is likely, and for the best interests of Britain, that some of the oil will be exported (eg. from BP's new terminal on the Firth of Forth) for refining on the Continent.

5 Precautions against Oil Pollution

The extent of the risk

The massive tonnage of oil which escaped from the *Torrey Canyon* when she ran aground off the Scilly Isles in 1967 brought home to the man-in-the-street the full implications of oil pollution. Governments had long since been concerned about the pollution risks entailed in the operation of very large tankers, and international organisations had been working towards co-ordinated action to minimise the risks. Following the *Torrey Canyon* incident, agreement was reached on such matters as the design and operation of oil tankers, intervention to prevent imminent pollution and compensation for pollution damage.

The reputation of oil tankers as potential causes of pollution has tended in the public's mind to rub off on to offshore operations: after all, offshore wells and pipelines are located in stormy seas, and hence conceivably they could, in some unfortunate combination of circumstances, give rise to serious oil pollution. This association of ideas seems logical, but in fact the record of offshore exploration and development is very good. In the whole history of offshore oil operations (and, in all, some 25,000 wells have been drilled), only one case of serious pollution has occurred—off Santa Barbara, California, early in 1969. And, in that case, the geological conditions were very unusual (the area had had a history of 'natural' seepage for years before the 1969 incident occurred), and were essentially different from those in the Continental Shelf. The possibility of this type of spillage occurring in the North Sea is therefore remote and no pollution has in fact occurred there.

A break in the pipeline connecting a well to the shore could conceivably occur, and oil would then escape into the sea. But, since operations are automatically controlled, the break would result in an immediate switch-off of pressure. The flow of oil would cease within minutes of switch-off.

Ruling out the pipeline as a possible culprit leaves us with one other candidate —the well. Here the only source of serious pollution would be a 'blowout' —an uncontrolled flow of oil into the sea from the formation being drilled or producing. Fortunately, blowouts are rare, but offshore operators regard the risk very seriously and take elaborate precautions to prevent them.

Precautions against pollution

The generally good record of offshore exploration cannot be allowed to lead to any relaxation of standards. In the past few years preventive measures have been stringently reviewed. For example, the Institute of Petroleum's revision of its Code of Safe Practice for Drilling and Production Operations in Marine Areas, which has recently been published, contains new recommendations covering the drilling and production of offshore wells. One of the recommendations stipulates how wells should be cased to contain and resist all expected pressures and loads, and subsequently tested to ensure that they are leak proof. Another relates to blowout-prevention equipment, and the necessary precautions to be taken in installing, operating and maintaining the wellhead control valves, blowout preventers and manifolds. A third, dealing with the producing stage, recommends the use of valves (both surface and subsurface) which close the well automatically if any abnormal conditions arise due to the failure of a flow line, wellhead or other equipment. The Institute of Petroleum Code, in short, contains a basic framework of recommendations to which operators can work in preparing their drilling programmes, though, since different offshore areas (and even different wells within the same offshore area) will inevitably have different characteristics, the specific operational standards applied will depend on the particular well.

Offshore drilling and production programmes for the United Kingdom sector of the North Sea have to be submitted to, and approved by, the Department of Trade and Industry's Petroleum Production Inspectors before operations start. In other words, no well (whether shallow or deep) can be drilled until the necessary technology for safe operation, including prevention of pollution, is embodied in the programme. The Department of Trade and Industry has also to be supplied each week with a report on the progress of drilling and the results obtained, and the Department's inspectors periodically visit all the installations to ensure that rules and procedures are being complied with. If a well is to be abandoned, the Department's consent has to be obtained, and the procedures (which include inspection by divers) are strict.

Operating procedures

Important for pollution prevention is the fact that offshore companies use only highly trained men for drilling and

production operations; indeed, the operations are too important (not to mention too expensive) for them to do otherwise. Most major oil companies run their own training courses, and their manuals cover, in minute detail, procedures for well control, blowout prevention and safety. Similarly every phase of the field operations is described in the drilling and production programmes.

On the Government side, the Department of Trade and Industry is preparing regulations under the Mineral Workings (Offshore Installations) Act 1971, which (dealing with such matters as the standard of construction of installations and equipment, precautions to be taken at sea, and proper supervision of operations) will, in effect, constitute a 'code' of rules for offshore operations. This code is aimed principally at the safety of personnel, but it also has an important bearing on prevention of pollution. Two other statutory controls are also worth mentioning in this context. First: in the interests of navigation, offshore installations have to be adequately lit and marked, and their locations publicised in notices to mariners and marked on charts. Secondly: to protect these installations, 'safety zones' are prescribed by statutory Orders, which prohibit the approach of shipping with no direct business with the installations. The Orders are binding on foreign as well as British shipping.

Emergency procedures

Prevention is better than cure, but arrangements have been made to ensure that, in the event of an emergency, the appropriate cure can be applied very quickly. All offshore installations are in radio and telex communication with shore bases, and supply and standby boats, and also helicopters, are ready on call. Any leak would be reported to HM Coastguard by the operators, who would have already put into effect their own standby arrangements for combating spillage. Oil companies have plans to co-operate closely in dealing with any emergency threatening to get out of hand, and, if serious coastal pollution were threatened, the comprehensive dispersant-spraying services set up by the Marine Division of the Department of Trade and Industry could also be brought quickly into play.

6 Safety in Offshore Operations

From the outset, the Government decided that one condition of licensing offshore exploration and development should be that the licensee should adhere rigidly to the safety instructions issued by the Secretary of State, and all licensing has been followed up by periodic inspections to ensure compliance. The instructions require, inter alia, that offshore operations conform to the Model Code of Safe Practice published by the Institute of Petroleum. This system has now, however, been superseded by the passing of the Mineral Workings (Offshore Installations) Act 1971, which provides the Government with specific statutory powers. The main recommendation of the Tribunal of Inquiry into the loss of the drilling rig *Sea Gem* was that a statutory safety code, supported by credible sanctions, should be prepared for application to offshore installations, and the Act implements the recommendation. The legislation covers all fixed and movable mineral-working installations (including, of course, oil and gas drilling and production platforms) used in waters around the United Kingdom, and provides for the safety, health and welfare of the staff of such installations as well as the safety of the installations themselves and of the operations carried out on or near them.

The Act came into effect in May 1972. In consultation with the organisations concerned, some Regulations have already been made, and others are now being prepared. Those so far introduced require owners and users to register installations and appoint managers to be in charge of safety on board. The managers appointed have to keep installation logbooks as a record of events bearing on safety, and the provisions include notification of accidents. Regulations now in preparation will deal with the following: certification of installation structures; the safety of installations when erected; the provision and use of emergency equipment; health and welfare; the safety of equipment used and safe working procedures; the control and safety of diving operations; and minor associated measures. The industry will therefore have to conform to a comprehensive series of mandatory safety requirements, all of which will be supported by sanctions, graded according to the type of offence, and enforced by the Petroleum Production Inspectorate of the Department of Trade and Industry.

Individual operators are, of course, reponsible for ensuring safety on their own installations, but, working through the Safety Sub-Committee of Offshore Operators, the companies as a whole have also set up contingency arrangements for mutual help in case of major incidents.

7 Benefits to the United Kingdom

North Sea oil and gas are of immense value to the nation. The main benefits are briefly as follows:

Reduced dependence on imported supplies

The United Kingdom's dependence on imported oil has been growing rapidly, and, with it, anxiety about the implications for the country's security which a breakdown in supplies would bring. In 1955, the United Kingdom used 23 million tons of petroleum products; in 1960 nearly 43 million tons; in 1965 67 million tons; and in 1971 96 million tons. In fact, imported oil now meets about half of all the energy needs of the country. North Sea petroleum should diminish this dependence in the not too distant future. The development of nuclear power will also play a part, and coal will, of course, continue to make a big contribution to the country's energy needs. The petroleum reserves, however, will make a new and valuable contribution. Over the past year natural gas has been flowing into the country at an average rate of about 2600 million cubic feet a day (the equivalent of some 34 million tons of coal a year). By about 1980 the United Kingdom sector of the

North Sea should be producing some 75 million tons of oil a year, equal to about half of our total consumption. As has been said, some of this oil will be exported and will earn foreign exchange; but, overall, offshore oil will contribute greatly to the security of our supplies, and this applies to Europe as a whole, bearing in mind that the entire European Continental Shelf may produce up to twice as much oil as the United Kingdom part alone.

Balance of payments

In 1971 the cost of the United Kingdom's oil imports was about £1,000 million, most of it foreign exchange. The savings accruing from use of North Sea oil will depend on world oil prices generally, but they will without doubt be very large—running into several hundred million pounds.

Exchequer revenue

Since 1964 the Exchequer has received about £66 million in revenue from bids, licence payments and royalties (see Table 5) and by 1980 revenue from oil and gas royalties and rents alone should be £100 million a year, even assuming that oil prices do not rise. If prices do rise, so will royalty payments. The producers will also of course be liable to Corporation Tax.

Employment and technology

Another very important benefit arises in the fields of employment and technology, for the exploration activities and gas and oil field developments have opened up wide-ranging opportunities for industry and for services in the United Kingdom, particularly in Scotland. There are firm prospects of some 8,000 jobs in Scotland from new projects already announced and the likelihood of a much greater number in the future. In the Northern Region, some 1500 jobs have already been created and another 1500 are likely in the next two or three years.

8 The Potential Market

The IMEG report

In May 1972 the Government appointed a firm of consultants, the International Management and Engineering Group of Britain Ltd (IMEG), to make a study of the expanding market for offshore goods and services. The study has now been completed, and IMEG's report (less some confidential sections relating to particular firms) is also being published. The report covers this extremely important subject in great detail, but it is appropriate also to mention the salient points here briefly.

Figure 13 Artist's impression of a drilling and production platform for use in BP's Forties oilfield, east of Aberdeen. The platform, some 550ft in height from the sea-bed, is shown superimposed on a drawing of Princes Street, Edinburgh.

Government policy

The Government has several times made clear its determination that British firms should be given full and fair opportunities to compete for orders for North Sea equipment and services, and the oil companies know that their record in this respect will be taken into account in the future allocation of licences. Arrangements have also been recently introduced by which the companies provide quarterly returns of their actual and prospective purchases of equipment and services. And, in the light of the IMEG report, the Government are now considering whether anything more should be done.

The Scottish Office and the Department of Trade and Industry are working together to ensure that Scottish industry is fully aware of the opportunities. The Department of Trade and Industry has offices in Glasgow and Edinburgh which provide a general liaison service for oil companies, contractors and industrial firms. The Scottish Economic Planning Board co-ordinates the provision of infrastructure requirements for supporting oil development, and a Standing Conference has been established to provide a forum for keeping Local and Development Authorities in Scotland informed of the situation as it develops.

Value of the market

There will be an average annual market of some £300 million for goods and services on the United Kingdom Continental Shelf. And this market is not likely to be a temporary phenomenon, for the United Kingdom Continental Shelf is likely to produce substantial quantities of oil for the rest of the century, and beyond.

As indicated on pages 9 to 11 of this report, offshore work can be divided broadly into three main stages: exploration, development, and product transfer. Each of these stages requires its particular equipment and services, and the market is therefore extremely wide-ranging. It encompasses, at the one extreme, specialist plant and goods which would find use only in offshore activities; at the other, fairly 'workaday' equipment which is used only incidentally in North Sea work; and, somewhere in the middle, conventional equipment adapted to the needs of offshore development. Much of the market can therefore be met by firms already producing equipment which could be offered with little or no modification, but, to exploit it to the full, industry will need to extend its technology into a virtually new field. No contractor in any country has yet, for instance, built a structure of the size and weight which will be required for the exploitation of the oilfields recently discovered in the United Kingdom Continental Shelf.

Oil companies engaged in exploration

for, and exploitation of, offshore hydrocarbons operate within strictly controlled schedules dictated by the heavy costs involved and the limits imposed by offshore weather conditions. In selecting their suppliers, they look for the right kind of management expertise, technological know-how, adequate capital and financial resources, and sound labour relations. It is a blend of these qualities, and, above all, management expertise, which will produce for them competitively priced equipment capable of doing the job in the time required. Some of the expertise may for a time have to come from abroad, and indeed there are a number of overseas interests seeking to collaborate with British concerns. However, given that some of the techniques and equipment required have still to be devised, there is much scope here for purely British inventiveness. As far as financial resources are concerned, there is a considerable willingness on the part of British financial institutions, including joint stock banks, merchant banks, investment houses and insurance companies, to consider well-founded schemes in this field.

Geographically and in many other ways Scotland is very well placed to take advantage of North Sea developments. So is the North East of England with its three major river areas (Tyne, Wear and Tees), all with a wealth of experience in marine and constructional engineering and in ship repair. The smaller ports also have much to offer—for example on the servicing side of the operation. In short, the market is big enough to bring major benefits to the North East and many other areas in addition to Scotland.

Because offshore development of hydrocarbons first took place in areas remote from the United Kingdom, the expertise in providing equipment of current design rests mainly abroad, particularly in the USA. Now, however, British industry, is beginning to play an increasingly important part in North Sea development. Four oil-production platforms (including the biggest ever) have been ordered for construction here—two for the Forties field, one for the Auk field, and one for Brent. Three of them are being built in Scotland. An order has also been received by a British firm for a gas production platform (for the Indefatigable gas field), this too to be constructed in Scotland.

Recent developments offer the hope that British industry can expand its share, not only of the North Sea market—though that by itself is of supreme importance—but also of the world offshore market. This is one of the most exciting available to us. It is fast-growing and potentially very large—perhaps three or four times as great as the United Kingdom market alone. Even now the technological problems it poses are formidable, and they will become more challenging as the oil industry moves into more and more difficult areas. But it is precisely because some of the problems are new that British industry has such a splendid opportunity to get into this market, provided its goods and services are competitive. It is one of the biggest opportunities ever presented to them.

9 The Future

In the near future activity on the United Kingdom Continental Shelf is expected to increase still further. The number of mobile drilling platforms at work in United Kingdom waters could almost double over the next year or two. More work will be done to the west of the Orkneys and Shetlands and exploratory drilling should also start in the Celtic Sea off the Welsh and Cornish coasts. Licensees are committed to drill more than 200 further wells (including 180 in deep waters) under the work obligations negotiated in the third and fourth rounds of licensing.

It is too early to forecast the ultimate potential of the Northern waters, or to predict the part likely to be played by the other areas of the Continental Shelf. But the splendid progress already made will continue. We can expect new finds to be made, and still further opportunities to open up for British industry. The next few years will be very exciting ones.

10 Tables

Table 1. Licensing criteria

1st Round

THE Minister of Power stated in the House of Commons on 7 April 1964, on the allocation of licences in the first round:

'Among the general considerations by which I shall be guided in carrying out this task are the following five main factors: first, the need to encourage the most rapid and thorough exploration and economical exploitation of petroleum resources on the Continental Shelf. Second, the requirement that the applicant for a licence shall be incorporated in the United Kingdom and the profits of the operations shall be taxable here. Thirdly, in cases where the applicant is a foreign-owned concern, how far British oil companies receive equitable treatment in that country. Fourthly, we shall look at the programme of work of the applicant and also at the ability and resources to implement it. Fifthly, we shall look at the contribution the applicant has already made or is making towards the development of resources of our Continental Shelf and the development of our fuel economy generally.'

2nd Round

THE Minister of Power described in the House of Commons on 21 July 1965 the considerations he would have in mind in awarding licences:

'In the Government's view, the over-riding objective is to secure the most thorough and rapid exploration and development of the oil and gas resources of the Continental Shelf in the national interest. I shall therefore consider all applications which can contribute to this end; and shall pay particular attention to the programme of work proposed and the capacity of the applicant to carry it out. I shall also take into account any exploration work already done by or on behalf of the applicant which is relevant to the areas applied for and his facilities for disposing, in this country, of any oil or gas won.

As required by the Regulations, all applicants must be citizens of the United Kingdom and Colonies resident in this country, or bodies corporate incorporated in the United Kingdom, and the profits of the operations will be taxable here. Where the applicant is a foreign-owned concern, I shall look at the extent to which British companies receive equitable treatment in that country. Other things being equal, however, I intend to give weight to the contribution which the applicant has made or is planning to make to our economic prosperity, including the strengthening of the United Kingdom balance of payments and the growth of industry and employment in this country, with particular reference to regional considerations. I shall also take into account any proposals which may be made for facilitating participation by public enterprise in the development and exploitation of the resources of the Continental Shelf.'

3rd Round

The Minister of Power stated in the House of Commons on 23 July 1969:

'The criteria by which I shall judge applications will be similar to those used in 1965, though with some added preference for groups involving the Gas Council and the NCB and other British interests. In the Irish Sea I intend to make two changes. First, it will be a stringent criterion that applications for licences should provide for participation by the Gas Council or the NCB, through direct partnership or options or other acceptable arrangements which the parties may agree between them. Secondly, I have informed the Gas Council that an application by the Council to act as operator in a limited area in the Irish Sea would be welcome to the Government so that the gas industry can gain the practical experience necessary to equip it to play an even more active role in the further development of the United Kingdom Continental Shelf.'

4th Round

Extracts from Notice published in the London Gazette on 22 June 1971:

'All applicants must be either citizens of the United Kingdom and Colonies resident in the United Kingdom, or bodies corporate incorporated in the United Kingdom.'

In respect of '*non-tender*' applications:
'The considerations (inter alia) the Secretary of State will have in mind in examining applications will be:—

(a) where a body corporate incorporated in a country outside the United Kingdom holds a controlling interest in the applicant, the extent to which equitable reciprocal treatment is accorded in such other country;

(b) the extent to which the applicant will further the thorough and rapid exploration of the oil and gas resources of the United Kingdom Continental Shelf, particular attention being paid to the financial and technical ability of the applicant to carry out an acceptable work programme, details of which will be called for when required during the consideration of the applications;

(c) exploration work already done by or on behalf of the applicant which is relevant to the areas applied for;

(d) where the applicant already holds a production licence or licences, his overall performance to date;

(e) the extent of the contribution which the applicant has made or is planning to make to the economy of the United Kingdom including the strengthening of the United Kingdom balance of payments and the growth of industry and employment.'

In respect of applications by tender:
'The Secretary of State reserves the right to reject the highest or any other tender, on all or any of the following grounds:—

(a) where the tender has been submitted by a body corporate, a controlling interest in which is held by a body corporate incorporated in a country outside the United Kingdom, if he is not satisfied that equitable reciprocal treatment is accorded in such other country;

(b) where the applicant has not observed all or any of the provisions of [the arrangements for submitting tenders];

(c) if he is not satisfied that the applicant has at his disposal the necessary technical resources to carry out a work programme competently;

(d) for any other reason, in which case the reason for doing so will be given to the applicant on request;

Subject to the Secretary of State's right in accordance with the discretions described above to accept or reject any tender, licences will be awarded to the highest tenderers; in the event of the highest or other acceptable tenders being equal, the tenderers or (if tenders have been submitted by or on behalf of more than one person) groups of tenderers concerned will be given the opportunity of accepting a joint licence each tenderer or group of tenderers, as the case may be, contributing an equal share of the premium offered. If a proposal to award a joint licence shall not have been accepted by all such tenderers within 14 days of the date upon which notice of the proposal was given the award of the licence will be at the discretion of the Secretary of State.'

Table 2. Licensing: Financial Arrangements

Round	Application Fee	Initial Payment per average block of 250 sq km	Annual Rental per average block of 250 sq km			Royalty
			7th Year	Increase per annum	Maximum	
First	£200, plus £5 for each block required over 10	£6250 (£25 per sq km)	£10,000 (£40 per sq km)	£6250 (£25 per sq km)	£72,500 (£290 per sq km)	12½%
Second	As above	As above	As above	As above	As above	As above
Third	As above	£7500 (£30 per sq km)	£12,500 (£50 per sq km)	£7500 £30 per sq km)	£87,500 (£350 per sq km)	As above
Fourth	As above	£11,250 (£45 per sq km)	As above	As above	As above	As above

Table 3. Petroleum Production Licensing—Round by Round

Round	Area under Offer	Number of Blocks	Number of Applications	Number of Companies	Number of Blocks Applied for	Licences		
						Number	No. of Companies	No. of Blocks
First (Sept. 1964)	North Sea	960	31	61	394	53	51	348
Second (Nov. 1965)	North Sea Irish Sea English Channel	1102	21	54	127	37	44	127
Third (June 1970)	North Sea Irish Sea Orkney/Shetland Basin	157	34	54	117	37	61	106
Fourth (Dec. 1971; March 1972)	North Sea Irish Sea Celtic Sea Orkney/Shetland Basin	421 for discretionary award; 15 for tender bid	92 31	228 73	271 15	118	213	282

Table 4. Licensed Areas of United Kingdom Continental Shelf

Location	Number of Licensed Blocks	Area of Licensed Blocks (sq. km.)	Area as % of Overall Licensed Area
North Sea	479	83,536	74.3
Irish Sea, Cardigan Bay and Celtic Sea	64	16,057	14.3
West of Shetlands	64	12,880	11.4
Overall	607	112,473	—

Table 5. Receipts from Offshore Licences—1964 to 1972

	1964/65 £	1965/66 £	1966/67 £	1967/68 £	1968/69 £	1969/70 £	1970/71 £	1971/72 £	1972/73 (First 6 months)§ £	Totals (1 April 1964 to 30 September 1972)§ £
Exploration Licences										
Application fees	400	20	—	240	20	40	440	320	120	1,600
Initial payments / Annual payments	20,000	21,000	17,000	12,000	13,000	15,000	23,000	38,000	28,000	187,000
Total	20,400	21,020	17,000	12,240	13,020	15,040	23,440	38,320	28,120	188,600
Production Licences										
Application fees	12,545	4,810	—	—	—	—	7,070	22,655	6,605	53,685
Initial payments	2,017,260	655,090	—	—	—	—	596,805	37,585,085*	2,515,306	43,369,546*
Annual payments	—	—	—	—	—	—	740,252	1,582,890	1,643,233	3,966,375
Total	2,029,805	659,900	—	—	—	—	1,344,127	39,190,630*	4,165,144	47,389,606*
Royalties	—	—	—	300,000	1,261,605	1,470,295	3,392,031	6,312,688	5,645,999	18,382,618
Grand total	2,050,205	680,920	17,000	312,240	1,274,625	1,485,335	4,759,598	45,541,638*	9,839,263	65,960,824*

*Includes £37,213,654 payment for Tender Blocks §Provisional

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